

EMSC Connects

Volume 2, Issue 12

December 2012

Emergency Medical Services for Children

Special points of interest:

- Croup and bronchiolitis examined
- Capnography and the pediatric patient
- Respiratory stats
- Happenings in EMSC

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A Word From Our Program Manager

Hi, my name is Whitney Levano and I am very excited to be working with Emergency Medical Services for Children. I have just started as the Program Manager of EMSC and I am already impressed with the work and dedication that is being accomplished by this program in our state. Everyone I have met so far is dedicated and passionate about the safety and care of Utah children.

the Safe Kids Program, fall prevention efforts,



Whitney and her husband before their wedding this summer

I come from the Violence and Injury Prevention Program within the Utah Department of Health, so my background is in injury prevention. I previously supervised

teen driving efforts, and the traumatic brain injury program. Ask me

about any of these programs and I will talk your ear off, but I hope I will be able to bring some ideas to the table for EMSC. I am new to the world of emergency medical services, so I also hope others will be patient with me as I learn the ropes.

I look forward to getting to know and work with everyone that is a part of Utah's pediatric EMS world and I wish everyone a Merry Christmas and Happy Holidays!

Thanks,
Whitney

Pedi Points

Tia Dalrymple RN, BSN

Case A: A 2 week old infant with a history of noisy breathing, cough and respiratory distress for several hours with occasional apnea. He was full term and seemed to be doing well since birth, but parents report a 2 day history of poor feeding. He is tachypneic and tired appearing. Vital signs: T 37.4, P 177, R 60, BP 90/60, oxygen saturation is 86% on room air.

Case B: A 2 year old female with a chief complaint of coughing and fever for 3 days. She is alert and is drooling. She has moderate retractions and appears tired. She was previously healthy. Vitals: T 38.3, P 100, R 26, BP 100/73, oxygen saturation 97% on room air.

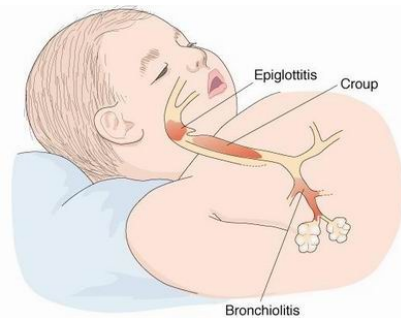


Image Source: croupcough.com

80% of cardiopulmonary arrests in children have a respiratory origin. Two of the most commonly seen respiratory diseases in the pediatric population are croup and bronchiolitis



Hypoxia usually means lower airway involvement. If the patient is hypoxic. You may be dealing with more than simple croup.

Pedi Points –continued

Two children. Do you know which has croup and which has bronchiolitis? You may be able to guess, but do you know the difference between the two? What are the signs and symptoms of each? What symptoms signal danger? How would you treat these children?

Few calls get a providers adrenaline pumping like that of the pediatric patient in respiratory distress. This is because we know that 80% of cardiopulmonary arrests in children have a respiratory origin. Two of the most commonly seen respiratory diseases in the pediatric population are croup and bronchiolitis. As we head into our “respiratory season,” it is useful to review these common culprits.

The Doc Spot

Howard Corneli MD

Attending Physician, PCMC Emergency Department
Professor of Pediatrics, University of Utah

Viral Croup

- 2/3 of all croup (laryngotracheobronchitis)
- A history of cold, congestion, and then a barking cough
- Often fever; which may be high
- More seasonal (November peak)
- This type only reoccurs in 5% of cases

Recurrent Croup

- 1/3 of all croup (spasmodic croup)
- Little history of viral symptoms or fever
- Sudden onset at night
- Less seasonal, more recurrent

“Croup Hunting” - Croup Recognition

- * Some cases are obvious with that barking cough
- * Some parents know croup (some don't)
 - * They may report stridor as a “wheeze” or “noisy breathing”
- * First responders may hear more stridor on initial assessment
 - * Good documentation and reporting can aid in diagnosis
- * Seasonal occurrence (November peak) or sporadic
- * Onset or increase of distress may be sudden
- * Rapid waning of symptoms is also a clue
- * Is her voice or cry hoarse or scratchy?
 - * Elicit cry or trigger cough

A Teaching Pearl - Hypoxia in Croup

Hypoxia usually means lower airway involvement. Only severe upper airway obstruction causes hypoxia. This means normal oximetry is not necessarily reassuring in croup. Croup patients may also have asthma which effects their lower airway, so abnormal oximetry needs clinical correlation.

The Doc Spot –continued

Transport Tips

- It's especially helpful to keep patient calm
- Keep with parent if at all possible
- Patients usually prefer to sit up
- Give Decadron (and ibuprofen) at outset
- Cool Mist may be used if available*
- Cool night air environment is helpful

*Mist may not be primarily effective, but does allow time for calming down. We find it helpful for this purpose.



Racemic epinephrine

- 0.5 cc/kg of 1:1,000 epinephrine (max 5 cc) via nebulizer
- Treatment lasts 2-3 hrs; disease lasts 2-3 days
- Use of epinephrine requires a minimum of 3 hour ER observation
- Avoid for mild, stable, or improving cases*
- If used, don't aggravate the patient

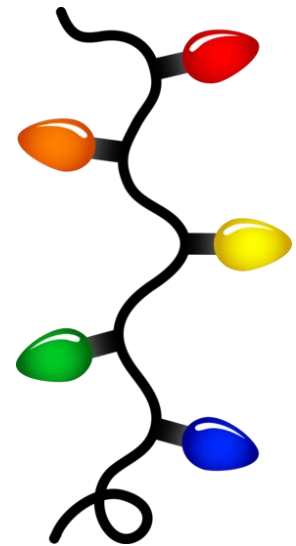
*Indications for Epi: Moderate to severe distress not relieved by calming and pain control.

Dexamethasone (In the Emergency Department)

- 0.6–1 mg/kg
- Oral works as well as IM
- Onset < 4 hours
- Useful to give as early as possible

Parting Shots

- Intubation for Croup? It is often difficult and it may cause post-negative-pressure pulmonary edema. Avoid it if at all possible. If needed, prepare as a difficult airway and preoxygenate. Prepare tubes in several sizes and lubricate well. Be wary of supraglottic or subglottic obstruction.
- Don't forget the Heliox (70:30 mixture of Helium and Oxygen). Studies have shown that Racemic Epinephrine and Heliox were equally effective treatments for croup (Weber et al. Pediatrics 2001;107(6):E96) and studies are looking at transporting with Heliox. (DiCecco, Rega: Air Med J. 2004;23:33-5)



Expert Input

Tia Dalrymple RN, BSN

Trauma Charge Nurse, PCMC Emergency Department

Bronchiolitis is an inflammation of the bronchioles, usually the result of a viral illness. Respiratory Syncytial Virus (RSV) is the most common viral cause. In fact, many providers and parents may use "RSV" as a nickname for bronchiolitis, but there are many other pathogens that can cause the infection including parainfluenza, adenovirus, and rhinovirus.

Bronchiolitis

- Most often in children, 0 to 24 months
- One of the few viral infections that can cause serious illness in newborns.
- Incidence is approximately 2.2 per 100 children annually.

RSV

Respiratory Syncytial Virus (RSV) is the most common viral cause of bronchiolitis, many parents and providers use the terms interchangeably, but RSV is not the only cause of bronchiolitis

Expert Input –continued

Symptoms

- Nasal secretions (lots)
- 1-4 day history of congestion with a low-grade fever
- Parents of infants will often report poor feeding, lethargy or agitation
- Breathing problems, including wheezing, retractions, and a “noisy” cough

Treatment

- Most treatments for bronchiolitis are unproved, leading to inconsistent treatment strategies
- It all boils down to supportive care
 - * Ensuring adequate hydration and oxygenation
 - * Careful monitoring for complications
- Our first line treatment in the ED is naso-pharyngeal (nose and throat) suctioning.
 - * Thorough suctioning can greatly improve distress (often no other treatment is needed). Many pre-hospital providers are reluctant to perform naso-pharyngeal suctioning, but it can be your greatest weapon against bronchiolitis.
 - Blub suctioning is a good tool.
 - To go deeper an 8Fr suction catheter will work well on most pediatric patients, but if secretions are thick and the nares are large enough, a 10Fr works better. Measure the distance from the tip of the nose to the ear lobe then insert the catheter into the airway to your measured point. Apply suction as you remove the catheter. Try to keep the treatment under 10-15 seconds and let the child catch his breath between attempts. If the child has thick secretions you can use a NS solution to soften things up (0.5mls in neonates to 2mls for older children). Observe the child’s respiratory rate and quality, color, heart rate, and SaO2 throughout the treatment.
- If the child is hypoxic even after suctioning, give oxygen to keep saturations greater than 94%. Hint:: infants tolerate a nasal cannula very well and it’s easier than chasing them with blow by.
- Albuterol
 - Effectiveness of bronchodilators in bronchiolitis is unproven. Our ED’s current practice is to trial one nebulized albuterol treatment (2.5mg). If there is no improvement the albuterol is discontinued.
- If patient continues with severe distress, intermittent apnea, or apparent respiratory failure we will implement high-flow, positive pressure ventilation, or endotracheal intubation.

Wright R, Pomerantz W, and Luria J. New Approaches to Respiratory Infections in Children. Pediatric Emergency Medicine 2002, 0733-8627

Croup and bronchiolitis are common ailments in the pediatric population. Most patients will recover quickly but as pre-hospital providers you will see the sickest of the sick. Case A our bronchiolitis baby, will be best served with deep suctioning and supportive oxygen therapy. Case B has croup and she will need dexamethasone and close monitoring, if she does not improve we will use racemic epinephrine. Knowing how to distinguish which illness you are dealing with, as well treatment options, will prepare your team for that pediatric respiratory call.



Image source: Inputsecpr.com

From the Field

Ryan Kirkman EMT-I, PCMC Technician

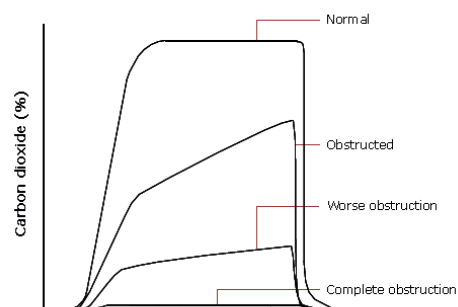
Capnography Use in the Pre-hospital Pediatric Patient

Capnography use in the adult and pediatric patient has become a gold standard for endotracheal intubation monitoring; and is rapidly becoming a standard of care in all adult patients suffering from respiratory distress. To review the range of values for end tidal carbon dioxide (ETCO2), 35-45 mmHg is the normal range, with 40 mmHg being optimal. There was some disagreement about the use of routine capnography in pediatric patients due to inconsistencies in the research data from earlier versions of equipment. The current versions of capnography tools offer a much more accurate assessment of ETCO2. The updated instruments offer active sampling by taking a sample of expired air from the patient through a tube into the machine for real time readings.

From the Field -continued

The routine use of non-invasive capnography in the pediatric respiratory patient is a valuable tool and one that is significantly under used in the pre-hospital setting. The real time ETCO₂ numbers provide an immediate assessment tool for the respiratory status of the patient. For instance, the provider treating a pediatric patient with a respiratory illness and ETCO₂ reading of less than 35 mmHg knows the patient is over breathing normal compensation mechanisms and is in real trouble. On the other side, the same patient with a reading of over 45 mmHg is hypoventilating and retaining CO₂. The provider in the latter situation now has a real time assessment tool to manage ventilation support in an attempt to bring the value below 45, and back into normal range.

The wave forms can also be a useful assessment tool; a normal box like tracing can have a number of different patterns depending on the underlying disease process. In the asthmatic patient the tracing tends to take on a shark fin appearance indicating the patient has a rapid inspiratory phase and a longer than normal expiratory phase, which is indicative of an acute asthma exacerbation. The more serious wave form seen is the dislodged endotracheal tube. The real time wave form of capnography would show an immediate flat line appearance indicating the tube is no longer in the trachea.



Capnography wave form can be a useful assessment tool

End tidal carbon dioxide monitoring has come a long way since its birth, and has developed into a very useful, very accurate assessment and monitoring tool. Providers who work in agencies that do not have ETCO₂ capabilities should encourage the implementation of such tools and protocols. The value of the information obtained from an adequately trained provider is invaluable to the proper treatment of the pediatric patient suffering from a respiratory emergency.

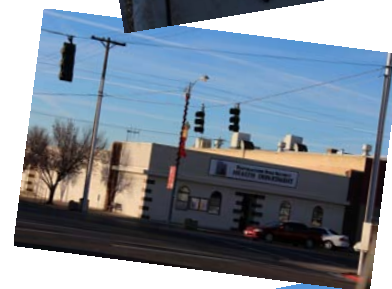
Happenings

On November 20th two of our EMSC Coordinators hosted a Children with Special Healthcare Needs (CSHCN) registry event. Beckie Peirce and Marty Wilson, both Carbon County Ambulance Paramedics, teamed up with Mae Aguayo and the Southeastern Utah District Health Department. They invited the families of CSHCN in to register for the EMSC Emergency Health Information Sheet program. With the help of many volunteers, including Martin Wilson our other Carbon County Coordinator, they manned the event from 8am to 4pm.

Volunteers walked parents through the online registration process while Marty and Beckie ran interference with the children. They were also able to take vitals for baseline measures. The event was a huge success as they were able to register more children in this one day, than we have seen in the last 3 months on the registry. They also used the time to educate many key people that work with these special children on the program and its' benefits.

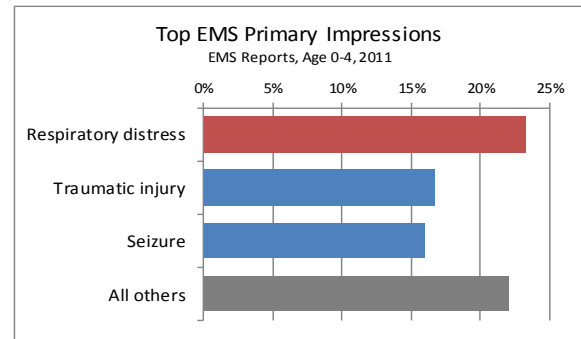
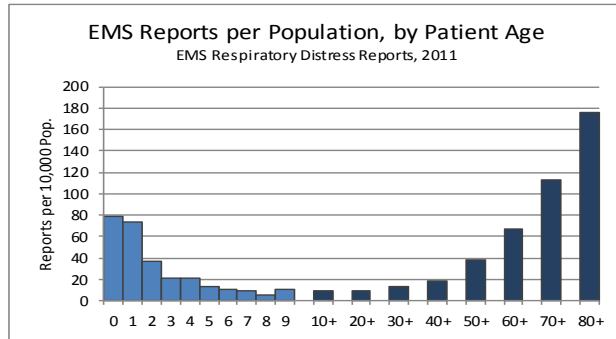
Many thanks to Mae and the local businesses that supported the event through the donation of free food; Fresh Market, Taco Bell, Taco Time, and Little Caesar's Pizza.

Way to go Marty and Beckie!!! That is one AMAZING qualifying event!!!

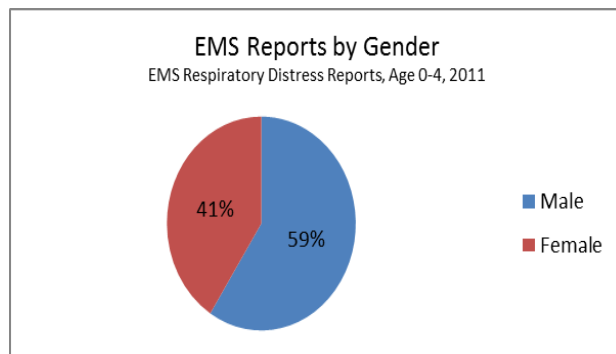


The Data Reveals -Utah's Respiratory Distress Data

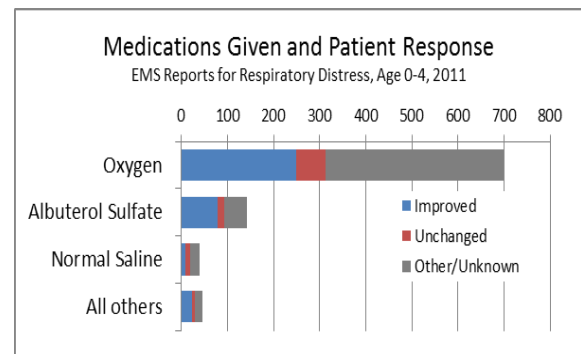
Josh Legler, Data Manager, Bureau of EMS and Preparedness



In EMS calls, respiratory problems are much more common in young children and the elderly. In fact, Respiratory Distress is the most common EMS primary impression among patients age 0-4.



Respiratory distress calls are more common among males than among females in the 0-4 age range. At older ages, this difference fades away.



Oxygen is the medication most commonly administered by EMS for respiratory distress in young children. Albuterol is next most common. Both are effective in most cases.

The above information came from POLARIS, Utah's statewide EMS patient care reporting system. You can find more Utah data on EMS calls for seizures and other conditions on IBIS at ibis.health.utah.gov. National EMS data is available at <http://www.nemsis.org/>.

Primary Children's Medical Center

Respiratory Virus Weekly Surveillance Report

Unique Patients by Encounter Positive for Respiratory Virus at PCMC by RSV-EIA, DFA, Culture or PCR Methods

PCMC and Other Intermountain Regions Respiratory Virus Activity for Week 45, Nov 17th Total Number of Unique Patients (<= 18 years old) per Encounter

Region	RSV	Influenza_A	Influenza_B	hMPV	Adenovirus	Parainfluenza	Rhinovirus	Total_Pt_Tests
Primary Childrens Medical Center	2	0	5	0	1	7	33	77
Urban Central Region	6	0	2	0	1	5	15	47
Urban North Region	4	0	0	0	0	3	9	29
Urban South Region	0	0	0	0	2	11	14	33
Southwest Region	0	0	0	0	2	4	12	23

Intermountain Healthcare- All Pediatric Patients- Total Patients Positive

RSV	Influenza_A	Influenza_B	hMPV	Adenovirus	Parainfluenza	Rhinovirus	Total_Pt_Tests
12	0	7	0	6	30	83	211

December 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6 <small>PGR</small>	7 <small>EMSC Advisory</small> <small>Board Mtg 1200</small> <small>Sevier Co PEPP</small> →	8
9 	10	11 <small>Davis Co PEPP</small>	12	13 <small>PGR</small>	14 <small>Mendon PEPP</small> →	15
16	17	18 <small>Davis Co PEPP</small>	19	20 <small>PGR</small>	21	22
23	24	25 	26	27	28	29
30	31					

EMSC Advisory Board Meeting, Dec 7th, 12:00

Pediatric Grand Rounds (PGR) are education offerings webcast weekly (Sept-May) by Pediatric Education Services at Primary Children's Medical Center. They offer CME credit for watching live, Thursdays 0800-0900. Archived presentations are also available. Visit www.primarychildrens.org/grandrounds for more information.

Trauma Grand Rounds Dec 14, 2012 at 0700 This offering alternates with EMS Grand Rounds every other month, it is geared towards hospital providers. Dr. Daniel Vargo will present Drowning in Crystalloid: The Evolution of Volume, Visit <http://healthcare.utah.edu/trauma>.



Save The Date

June 13-15, 2013 Annual EMSC Coordinators Retreat

March 1, 2013 The EMSC Workshop. A wide variety of pediatric specific conditions will be discussed in a lecture format followed by small group break-out sessions. The workshop is approved for 8.25 CME credit hours The \$75 registration fee will be refunded to Utah EMTs and Paramedics upon course completion. Lunch is included. **Registration opened October 15** and is limited to 50 participants. Email hannah.nicksic@imail.org for other questions.

Upcoming Peds Classes

Jan 2013:

11 & 12: Brigham City PEPP
14 & 15th: ENPC MVH, Payson
15th & 16: Weber State PEPP

22nd & 23rd:
PALS Certification MVH
24th & 25th: TNCC MVH



Emergency Medical Services For Children

Utah Department of Health
Emergency Medical Services and Preparedness
Emergency Medical Services for Children
3760 S. Highland Drive, Room 545
Salt Lake City, UT 84106

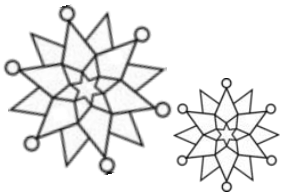
Phone: 801-707-3763
Fax: 801-273-4165
E-mail: Dalrymple@utah.gov
Salt Lake City, UT 84114-2004



We're on the web

<http://health.utah.gov/ems/emsc/>
and on Twitter EMSC Utah

The Emergency Medical Services for Children (EMSC) Program aims to ensure that emergency medical care for the ill and injured child or adolescent is well integrated into an emergency medical service system. We work to ensure that the system is backed by optimal resources and that the entire spectrum of emergency services (prevention, acute care, and rehabilitation) is provided to children and adolescents, no matter where they live, attend school or travel.



Meet Our Coordinators

Kris Shields RN, CPEN; Millard County



**Kris Shields, The EMSC
Coordinator of the Year, 2012.**

After many years in healthcare, I am grateful that I am still in this profession and have this opportunity to say a few words and give a little back ground about myself. 23 years ago, a dear friend of mine talked me into joining our local ambulance team. Little did I know then how that decision would shape who I am today. From the beginning I was involved in training and teaching. I joined EMSC in its beginnings in the early nineties. Some of the best experiences I have had were when I was running as an EMT-I with my dear friends and good buddies, with Millard County EMS. I ran with this agency for approximately 19 years and have been the Millard County EMSC Coordinator for the last 10 years.

I haven't been able to get enough. The more and more I did as an EMT, thoughts of becoming a nurse materialized. Thanks to encouragement from an awesome ER nurse and doctor, I decided to go to school and have become a nurse and not just any nurse... an ER nurse!! Imagine that! This is my love, along with teaching, education, injury prevention, and of course still being involved with EMS. EMS and EMSC has truly shaped my life. I currently work at Mountain View Hospital in Payson as a full time ER nurse. Things I love about being a nurse are working with exceptional nurses and docs and working with kids. I love trauma and cardiac emergencies. I also love to coordinate and teach BLS, PALS, ACLS, TNCC, & ENPC in Fillmore, Delta, and Mountain View hospitals. I cannot forget my dear friend Andy and how I love to teach PEPP & PALS with him for EMSC. Thanks Andy!

Yes- EMS, ER, EMSC, teaching, and all that stuff I mentioned is very dear to me, but my truest love is my family. My other full time job is being married to a Utah State Trooper and raising two wonderful daughters. We love spending time with each other doing things like four wheeling, camping, fishing, and hunting (I carry my own license and gun). I love spending time with my husband and our new hobby, cycling. There are two benefits of this cycling craze, first being the time we are together and the second, it keeps Dean in shape trying to stay up with me :-D thanks EMS and EMSC for everything!!